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ABSTRACT

A study was conducted to determine if actual California Achievement Test subtest scores were significantly different than expected in a large, urban school district that had just implemented its first component--staff development--based on the Effective School Model (ESM). Subjects consisted of 1,591 fourth through sixth graders and 1,557 sixth through eighth graders who had been grouped according to subgroup characteristics. Regression was used to obtain predicted scores and a dependent t test was applied to compare the actual and predicted means. For sixth and eighth graders, overall achievement was at or above the expectancy level for most subgroups. Average actual reading scores for sixth graders were significantly higher than expected; however, sixth-grade students from upper socioeconomic groups fell significantly below expectations for reading and language. For eighth graders, actual average reading and mathematics scores were significantly below expected. Findings suggest that educational administrators should: (1) continue to implement the components of the ESM, initiating measurement of student success immediately and focusing on high-risk students; and (2) attend to long-term, rather than short-term, trends. Two data tables are included. (Author/TJH)

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ACTUAL VS. EXPECTED ACHIEVEMENT OF STUDENTS IN A DISTRICT WHICH HAS IMPLEMENTED THE EFFECTIVE SCHOOL MODEL

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Abstract

The purpose of this study was to determine if the actual California Achievement Test subtest scores of 1,591 fourth-grade students and 1,557 sixth-grade students, grouped according to subgroup characteristics, were significantly different than expected in a large, urban school district which has just implemented its first component based on the Effective School Model, staff development. Regression was used to obtain predicted scores and a dependent *t* test was applied to compare the actual and predicted means.

In grade six and eight, overall achievement was at or above expectancy level for most subgroups. Average actual reading scores for sixth grade were significantly higher than expected; however, upper socioeconomic groups in reading and language were significantly below expected for sixth grade. For eighth grade actual average, reading and math scores were significantly below expected.

Implications for further implementation of the components of the Effective School Model are discussed.

Actual vs. Expected Achievement of Students in a District Which Has Implemented the Effective School Model

In the 1960s, no social institution found itself in greater difficulty than public education. Buffeted by social problems of segregation, drugs, and changes in family structure, education came under great criticism while at the same time the public was demanding that the schools assume a greater role in society (Alioto, 1971). The public dissatisfaction with schools derived from many sources including declining test scores (Lezotte, Hathaway, Miller, Passalacqua & Brookover, 1980).

In 1966, Coleman issued a report, Equality of Educational Opportunity, which concluded that the impact of a school was negligible. Coleman asserted that the family and socioeconomic status of the family played a greater role in the success of the child than did the school. Other researchers tried relating school inputs to outputs and concluded that factors affecting student achievement lay chiefly outside the control of the school (Block, 1983). These reports engendered an air of hopelessness in the educational community (Lezotte et al., 1980).

A group of researchers expressed disagreement with Coleman's findings, and during the 1970s, the first

effective school studies were published. This research is grounded in the belief that all students can learn regardless of their socioeconomic status if given the appropriate time, conditions and instruction. Ronald Edmonds became one of the key figures in the school effectiveness movement. He articulated the idea that schools do make a difference and that some schools have a greater impact than others (Edmonds, 1978). Edmond's major contribution was the development of a model of effective schools that is the foundation of the improvement models now being implemented in many of America's schools (Brophy & Good, 1984).

The Edmonds Effective School Model is based upon the identification of schools with students experiencing high levels of achievement and the systematic identification of the characteristics of these schools. School district leaders and building level practitioners implement programs based on those identified characteristics that are consistently found in schools with high levels of student achievement. Effective school researchers name these characteristics correlates.

Much of the effective schools research can be described as case studies. In general, the methodology is limited to descriptive studies that do not result in cause and effect findings. There has been little

research conducted to measure the effects of school improvement programs based on the Effective School Model that has been implemented. Additionally, there remains a need to scientifically measure the impact of the Effective School Model on the learning of all students.

Background

The National Commission on Excellence in Education in its report, A Nation at Risk, stated:

> We do not believe that a public commitment to excellence and educational reform must be made at the expense of a strong public commitment to the equitable treatment of our diverse population. The twin goals of equity and high quality schooling have profound and practical meaning for our economy and society, and we cannot permit one to yield to the other either in principle or in practice. To do so would deny young people their chance to learn and live according to their aspirations and abilities. It also would lead to a generalized accommodation of mediocrity in our society on one hand or the creation of an undemocratic elitism on the other. (April, 1983, p. 13)

Based on the literature of the 1980s, there is much agreement that schools must provide both quality education and an opportunity for all students to achieve

excellence (Lezotte & Bancroft, 1985). The public also has come to hold the educational institutions more accountable. In response to state and local mandates for accountability, some school leaders have adopted the Effective Schools Research Model as a theoretical framework for school improvement and have implemented programs based on the identified characteristics. However, the complete evidence is not in to support the theory that developing these certain characteristics will in fact produce schools/school districts that will be successful with all students (Lezotte & Bancroft, 1985).

Early researchers in the effective school movement did successfully identify schools in which there was a high rate of success for both high and low socioeconomic students and in which the rates of success for these students were proportionate (Edmonds, 1979). More recently, other demographic characteristics of gender and number of parents in the home and their relationship to student achievement have been analyzed. However, most of the studies have examined the independent effects of these demographic characteristics on student achievement. Little research has been conducted to measure the composite effects of these characteristics (Grant & Sleeter, 1986).

The importance of this composite data becomes

evident in light of demographic trends of the student population. An increasing proportion of our students will come from single parent homes. Additionally, minority enrollment as a percent of total enrollment will increase, and more of our students will be living in poverty (Snyder, 1986).

It has been noted that the early effective school research studies were descriptive. Only recently have studies been conducted to measure and analyze student achievement in a district that implemented the Effective School Model. This study augments these recent efforts. The general purpose was to determine if the actual achievement of students with certain subgroup characteristics is significantly different than expected within grades six and eight. The study was conducted in a large, urban Mississippi school district that has systematically been implementing a school program based on the Edmond's Effective School Model.

During the second semester of 1984-85, a major component of the effective school model, staff development about the effective school movement, for all instructional staff was implemented. Training modules were used as the vehicle for presenting the philosophy and correlates of the Effective Schools Model.

This study was conducted using certain achievement

data about selected students in grades four, six and eight during the period 1985-1987.

Specifically, the purpose of the study was to do the following:

1. Determine if the actual and expected total reading, total math and total language achievement of students differs significantly within grades six and eight.

2. Determine if the actual and expected achievement of students according to each subgroup based on the demographic variables of gender, socioeconomic status, race, number of parents in the home and various combinations of these variables differs significantly within grades six and eight.

Methodology

The setting of this study is a school district composed of about 32,500 students in 37 elementary schools, 10 junior high schools, and 7 senior high schools. In 1986-87, demographic characteristics of the total school district student population were approximately as follows: 52% female, 48% male, 78% black, 22% white or other, 58% low socioeconomic status, 42% middle/upper socioeconomic status, 48% were from one parent homes and 52% were from two parent homes. Percentages are fairly consistent from

grade level to grade level and year to year in the study.

In 1984-85, the California Achievement Test-77, Form E, Level 14, was used to measure the achievement of fourth-grade students. Level 16, California Achievement Test, Form E, was used to measure the achievement of sixth-grade students. In 1986-87, the California Achievement Test-85, Form E, Level 16, was used to measure the achievement of sixth-grade students, and Level 18 measured the achievement of eighth-grade students.

Linear regression was used for the entire population and for each subgroup. The population and each subgroup were randomly divided into two subsamples. One subsample was used to obtain predicted (expected) scores, and the other was used for calibration. On the first subsample a regular regression analysis of the fourth grade onto the sixth grade scores and sixth grade onto the eighth grade scores was performed. This procedure yielded regression equations. The equations were then applied to the predictor variables of the second subsamples which yielded an expected score (Y') for each subject. The expected scores were then compared to the actual scores in the second subsamples by means of a dependent t test.

Insert Table 1 about here

All students enrolled in grades four and six in the district in 1984-85 with matching data in 1986-87 were utilized. Table 1 contains information concerning the distribution of students within the district. There were 1,591 students across grades four to six and 1,557 students across grades six to eight with matching data.

Subgroups are groupings of students' test data based on the variables of socioeconomic status, number of parents in the home, race, gender, and combinations of the variables of gender, race, socioeconomic status and number of parents in the home. These subgroups will be represented by abbreviations (i.e., LWF1, LWF2, UBM1 and UBM2).

a. SES is socioeconomic status
b. L is composed of low socioeconomic students.
c. U is composed of middle/upper socioeconomic students.
d. F is composed of female students.
e. M is composed of male students.
f. W is composed of white students.
g. B is composed of black students.

h. 2 is composed of students from two-parent homes.

i. 1 is composed of students from one-parent homes.

j. LWF1 is composed of low SES, white females from one-parent homes.

Insert Table 2 about here

Results

Correlations between 1985 and 1987 scores for all groups were moderate to strong (.29-.79). Table 2 contains a summary of results for all of the tests which were performed. There was a significant positive difference (i.e., actual achievement exceeded expected) in the actual and predicted scores for grade six students in the area of reading; LBM1 in reading, math and language; and LBF2 in reading. Also in grade six, expected schievement among upper socioeconomic students significantly exceeded their actual achievement in the areas of reading and language.

Although there were some positive differences, none were significant in the eighth grade. There were, however, negative significant differences in the areas of reading and math for all eighth grade students; for lower socioeconomic students in reading and language; for male students in reading; for female students in math; for

white students in language and for upper socioeconomic white males and females in math.

Discussion

The findings of this study, which involve integrating the characteristics of SES, number of parents in the home, gender and race, are mixed. No consistent pattern developed for any subgroup across subject areas at both grade levels.

It was anticipated that subgroups with low SES would have a significant difference in actual and expected scores. Edmonds (1979) asserted that low SES students can experience increased rates of academic growth in schools which exhibit the characteristics identified by the effective school researchers.

It was not anticipated that subgroups with the upper SES variable would have significant differences in actual and expected achievement. Contributing to this hypothesis was Stern's (1984) phenomena called the "ceiling" effect. It has become commonly accepted that SES is positively related to student achievement levels with students in the upper level scoring higher and subgroups of students in low SES scoring lower. Thus, subgroups in upper SES would have less potential for adding value.

It was anticipated that there would be significant differences in actual and expected scores of subgroups

based on gender and that male students would have increased rate of growth. Edmonds (1979) maintained that high-risk students, low SES black males scored significantly better in schools with the identified effective school characteristics. Further, it was anticipated that there would be a lesser rate of growth for female students. It is generally accepted that females exhibit a decrease in achievement, particularly in math, as they enter adolescent years.

The effects of the integration of these characteristics through the use of subgroups was unclear. Socioeconomic status, family structure, gender and race tend to be treated as separate issues in the literature (Grant & Sleeter, 1986).

The data indicate a significant positive difference in actual and expected overall achievement of grade six students in reading; grade six LBM1 in all component areas of reading, math and language; and grade six UBF2 students in reading. These results are in agreement with the research of Edmonds (1979) about the achievement of high risk students. Moreover, the outcome in overall reading achievement seemed in line with the positive significant differences in the achievement of lower socioeconomic subgroups.

It was not anticipated that the achievement of grade

six UBF2 in the area of reading would be significantly higher. However, this finding is consistent with the finding of the descriptive study by Fortenberry, Tadlock and Allen (1987) that reported lower SES students from two-parent homes score better than those from one-parent homes. Because of the short span of the study and the recent implementation of the staff development component of the Effective School Model, it was assumed that students in the grade six USES subgroups would simply maintain the previous rate of growth while LSES subgroups would surpass their previous rate of growth.

In grade eight, overall achievement of students in reading and math; USES students in reading and language; male students in reading; female students in math; white students in language; UWF2 and UWM2 was significantly lower than expected. Actual and expected scores for subgroups LBF1, LBF2, LBM1, LBM2, and UWF2 were not significantly different, although actual scores tended to be higher than expected for these groups. It was anticipated that all subgroups with the LSES variable would be significantly higher based on the effective schools research.

The Effective School Model provides a framework for school improvement. The purpose of the components of the model is to ensure that all students learn the minimum

basic skills (Edmonds, 1979). Because the responsibility for student achievement lies with the instructional leaders of the school and school district, these leaders must carefully design measures of student achievement and examine the measures of student success as they implement the various components of the model.

The findings of this study suggest the following to educational administrators:

1. Continue to implement the components of the Effective School Model and have a planned system for expanding the program.

2. Measurement of student success should begin immediately as the first component of the Model is introduced to the school program. Even in a short span of two years with only one component being implemented, at least one high-risk subgroup of sixth grade students can have an increased rate of growth in all component areas.

3. When planning for school district equity reform based on the Effective School Model, anticipate the need for long term commitment.

4. For the short term, the rate of growth of some subgroups may actually decrease if proper precaution is not taken.

5. An impact on the rate of growth of a larger

number of subgroups can be made across grades four to six than across grades six to eight within a two-year period of time.

6. In a systematic way, provide within the curriculum expansion and enrichment activities and materials for students. The core curriculum should be the minimum that each student should be expected to master.

7. Administrators need to continue to focus on high-risk students, especially low SES black males from one-parent homes. There can be positive short-term results. Expand the target to include other subgroups and grade levels of students who do not maintain their previous rate of growth.

8. Correlations between 1985 and 1987 scores in the calibration subsample show realistic indexes for gauging normal student progress. The advantage of obtaining these correlations is that normal student progress can be assessed based on data from these individual demographic subgroups of which the student is a member.

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TABLE 1

VARIABLE LABEL, NUMBER OF SUBJECTS, PERCENT OF STUDENTS BASED ON A SINGLE VARIABLE FOR GRADE SIX AND EIGHT

Variable Label	Grade 6 Number of Subjects	Grade 8 Number of Subjects
Unknown	25*	28*
LSES	1,047	1,022
USES	519	507
White	372	301
Black	1,194	1,228
1 Parent Home	720	736
2 Parent Home	845	793
Female	829	810
Male	737	716
TOTAL	1,591	1,557

*Twenty-five students could not be classified in any one of the defined groups due to insufficient recorded information.

*Twenty-eight (1.8%) could not be classified in any one subgroup due to insufficient recorded data.

SUMMARY OF RESULTS OF TESTS
SCORES FOR GRADES

	All	USES	LSES	M	F	B	W	1P	2P	LWF1	LBF1	LWF2
Rdg	⊙	⊖	+	+	+	+	+	+	+	I	+	I
Math	+	+	+	+	+	+	+	+	+	I	+	I
Lang	+	⊖	+	+	+	+	+	+	+	I	⊙	I
Rdg	⊖	+	⊖	⊖	+	+	+	–	+	I	+	I
Math	⊖	+	+	+	⊖	+	+	+	+	I	+	I
Lang	–	+	⊖	+	+	+	⊖	+	+	I	+	I

Key

+ = above expectancy level

⊙ = significantly above expectancy level (.05)

– = below expectancy level

⊖ = significantly below expectancy level (.05)

I = Insufficient number of subjects

TABLE 2

S OF HYPOTHESES FOR DIFFERENCE IN ACTUAL AND PREDICTED
SIX AND EIGHT IN READING, MATH AND LANGUAGE

LBF2	LWM1	LBM1	LWM2	LBM2	UWF1	UBF1	UWF2	UBF2	UWM1	UBM1	UWM2	UBM2
	Grade 6											
•	I	⊙	I	•	I	I	•	⊙	I	I	-	•
•	I	⊙	I	•	I	I	•	-	I	I	-	•
•	I	⊙	I	•	I	I	•	-	I	I	•	•
	Grade 8											
•	I	•	I	•	I	I	•	-	I	I	-	•
•	I	•	I	•	I	I	⊖	-	I	I	⊖	•
•	I	•	I	•	I	I	•	-	I	I	-	•

Expected Achievement